

# Metric Gauge Fields in Deformed Special Relativity

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**Abstract:** We show that, in the framework of Deformed Special Relativity (DSR), namely a (four-dimensional) generalization of the (local) space-time structure based on an energy-dependent "deformation" of the usual Minkowski geometry, two kinds of gauge symmetries arise, whose spaces either coincide with the deformed Minkowski space or are just internal spaces to it. This is why we named them "*metric gauge theories*". In the case of the internal gauge fields, they are a consequence of the deformed Minkowski space (DMS) possessing the structure of a generalized Lagrange space. Such a geometrical structure allows one to define curvature and torsion in the DMS.

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## 1. Introduction

It is well known that gauge theories play presently a basic role in describing all the known interactions. In all cases, gauge symmetries are related to physical fields directly arising from the symmetries ruling some given interaction; on one side, this leads to the rising of a new, dynamical gauge field; on the other hand, if the gauge symmetry is broken, such a circumstance provides one with new — often unforeseen — informations about the structural properties of the interaction considered.